Beware the Downside of *Free* Map Data

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Maps and charts are the lifeblood of the oil and gas industry, and most petroleum executives crave the ability to visualize exploration maps in a dashboard format. The advent of free applications such as Google Earth has made complex imagery available to everyone, and while this online tool has raised awareness of the "power of the image," it has also created problems. For example, one cannot judge the precision, vintage, spatial accuracy or resolution of a given image merely by inspection. "Where is that well we drilled last year?" you might reasonably ask. Having the answer to critical questions is essential before putting a map into the wild, lest you run the risk of losing a deal because of lack of due diligence. For the casual user of Google Earth, these are not concerns and therefore not talked about much. As professionals, though, we must ask these questions.

A picture is worth a thousand words

Virtually any source map can be scanned and tied to geographic coordinates to form an imagery data source. For imagery data to be useful in a Geographic Information System, however, it must be tied to coordinates and overlaid with other data such as oil well or pipeline locations. Exploration geologists commonly use imagery in the form of an air photo, topographic map, or satellite image to add a sense of "ground truth" to their maps. Points, lines, and polygons in isolation simply do not convey the same sense of truth, even though they may be precisely placed. A picture is worth a thousand words. Given an air photo, an oil company executive can instantly see the location of wells and other infrastructure. The euphoria this creates is undeniable, but sometimes misplaced unless one has confidence in the underlying process that was used to acquire and process the data.

The potentially high cost of "free"

There are several "gotchas" associated with imagery and many points along the way where errors can be introduced. Sources of free data do not provide sufficient information about an image, such as its production date and quality. If you zoom out in Google Earth, for example, you can see many strips of data of varying quality, color schemes, and vintage. Where does the recent imagery start and old imagery stop? Such information is critical for exploration companies. In addition, free map services tend to have updated data primarily in urban areas because that's what most casual map users care about. Not so in the oil and gas industry where our infrastructure tends to be located in rural locations, which often have the least up-to-date map data on the free sites.

Data overload

Imagery data can quickly fill up local storage space, even on very large computers. As data resolution increases (and engineers always want the highest resolution data available), imagery fills up disk space exponentially faster. A consequence is that 30-centimeter resolution data require nine times more storage space than the standard one-meter resolution data of just a few years ago. This trend is unlikely to change.

Because different client applications require data in different formats, on today's servers you'll find multiple versions of the same data in different formats just burning up disk space. Imagery management quickly becomes a mess when dealing in terabytes, and IT staff spend more and more time documenting inventory, allocating server space, and updating ever larger databases when they could be focusing on revenue enhancing activities.

Third party services have evolved to address these problems, taking on the tasks of maintaining the expanding imagery database so that it can be streamed directly to oil and gas applications. For now, this involves loading the various imagery datasets and establishing web services that client applications can consume. Clients can offload internal proprietary imagery to a third party vendor and have that data streamed back into the company. This web service reduces the burden on corporate IT, saving time and money.

The future of imagery

In the future, organizations will likely take advantage of evolving technologies such as Cloud Computing with its nearly infinite computing and storage capabilities. Challenges will include uploading and downloading vast amounts of data, including rapidly changing proprietary data sets. However, the computational power of the 'Cloud' environment will offer many benefits including speed of access and the ability to use extract, transform, and load technologies to reformat data "on the fly."

Free maps have popularized geospatial imagery, but they simply don't offer the quality, robustness, or versatility needed for modern scientific exploration. The vision of the future is to store and maintain dynamic, up-to-date, multi-terabyte imagery databases on the Cloud and speedily stream those data back into the enterprise for near real time analysis and decision making. The good news is that this future isn't all that far away. Already, Web Mapping Service (WMS) technology makes it possible to maintain enormous volumes of image data on remote servers and stream them directly into WMS-enabled mapping software such as Petra, GeoGraphix, and ArcMap. ■

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